MACTEC ENVIRONMENTAL RESTORATION SERVICES, LLC

Log Event A

Borehole 30-00-09

Borehole Information

Farm : C	**Tank :** C	**Site Number :** 299-E27-57
N-Coord : 42,889	**W-Coord :** 48,583	**TOC Elevation :** 653.46
Water Level, ft :	**Date Drilled :** 12/31/1944	

Casing Record

Type : Steel-welded	Thickness : 0.313	ID, in. : 8
Top Depth, ft. : 0	Bottom Depth, ft. : 150	

Borehole Notes:
Borehole 30-00-09 was drilled in December 1944 and completed to a depth of about 150 ft with 8-in. casing. No driller's log was available for this borehole to provide construction details. However, based on the date of construction, the borehole's location, borehole information presented in Chamness and Merz (1993), and the construction details from the field, it is believed that this borehole is similar in construction to boreholes 30-00-03 and 30-00-06. In boreholes 30-00-03 and 30-00-06, a string of 12-in. surface casing is present from just below the ground surface to a depth of about 54 to 58 ft. The 8-in. casing is assumed to be perforated from the bottom of the surface casing (at about 54 ft) to the bottom of the borehole with five perforations per foot. The bottom 8 in. of the borehole was probably grouted with cement.

The zero reference for the SGLS logs is the top of the 8-in. casing. This borehole is located on the side of a steep hill, and the top of the 8-in. casing is approximately 1 ft above the surface of the slope and approximately 11 ft above the tank farm ground surface. The current depth of the borehole, as verified with an electrical tape, is 58 ft. There is no information given as to when or how the bottom portion of the borehole was filled.

Equipment Information

Logging System : 2	**Detector Type :** HPGe	**Detector Efficiency:** 35.0 %
Calibration Date : 10/1996	**Calibration Reference :** GJO-HAN-13	**Logging Procedure :** P-GJPO-1783

Log Run Information

Log Run Number : 1	**Log Run Date :** 04/01/1997	**Logging Engineer:** Bob Spatz
Start Depth, ft.: 57.5	**Counting Time, sec.:** 100	**L/R :** L **Shield :** N
Finish Depth, ft. : 1.0	**MSA Interval, ft. :** 0.5	**Log Speed, ft/min.:** n/a

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Analysis Information

Analyst : D.L. Parker

Data Processing Reference : MAC-VZCP 1.7.9 Analysis Date : 09/09/1997

Analysis Notes :

This borehole was logged by the SGLS in one log run. The pre- and post-survey field verification spectra met the acceptance criteria established for the peak shape and detector efficiency, confirming that the SGLS was operating within specifications. The energy calibration and peak-shape calibration from these spectra were used to establish peak resolution and channel-to-energy parameters used in processing the spectra acquired during the logging operation. There was negligible gain drift during logging operations, and it was not necessary to adjust the established channel-to-energy parameters during processing of log data to maintain proper peak identification.

This borehole is probably double-cased from an unknown depth near the ground surface to about 58 ft. An appropriate casing correction factor for the double-cased portion of the borehole could not be applied because of the attenuation caused by the double-steel casings in this interval and the potential for grout between the two casings.

A casing correction factor for a 0.330-in.-thick casing was applied during the analysis of borehole data. This correction factor most closely matches the actual thickness of the 8-in. casing. Use of this casing correction factor will cause the radionuclide concentrations to be overestimated below the double-cased portion of the borehole and significantly underestimated in the double-cased portion of the borehole.

The top 1 ft of the borehole casing extends above the ground surface and was not logged.

Cs-137 was the only man-made radionuclide detected in this borehole. Cs-137 contamination was detected continuously from 1 to 3 ft.

The logs of the naturally occurring radionuclides show a decrease in KUT concentrations below 4 ft. An increase in K-40 concentrations was detected below 42 ft, and a decrease in K-40 concentrations was detected at about 57 ft.

Details concerning the interpretation of data for this borehole are presented in the Tank Summary Data Reports for tank C-110.

Log Plot Notes:

Separate log plots show the man-made and the naturally occurring radionuclides. The natural radionuclides can be used for lithology interpretations. The headings of the plots identify the specific gamma rays used to calculate the concentrations.

Uncertainty bars on the plots show the statistical uncertainties for the measurements as 95-percent confidence intervals. Open circles on the plots give the MDL. The MDL of a radionuclide represents the lowest concentration at which positive identification of a gamma-ray peak is statistically defensible.

A combination plot includes the man-made and natural radionuclides, the total gamma derived from the spectral data, and the Tank Farms gross gamma log. The gross gamma plot displays the latest available

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digital data. No attempt has been made to adjust the depths of the gross gamma logs to coincide with the SGLS data.